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ABSTRACT

Inspired by the work of Donald Schon and John Dewey, educators today consider reflective practice a viable alternative to the technical-rational paradigm that has historically dominated educational thought in the United States. This paper argues that wholetheme constructivism can lead to a deeper understanding of reflective practice. Dewey distinguished between the stream of consciousness that runs through a person's mind and disciplined, reflective thought. Reflective thought is purposeful and directed, intent on understanding, and creating meaning from an interaction or realization. As disciplined thought, reflection can be enhanced by training children to think that way. Building on Dewey's work, Schon emphasized the tacit or intuitive nature of knowledge and the ways of revealing it through self reflection. Wholetheme learning is proposed as a way of taking advantage of the multisource aspects of brain operation. Considering reflection as expressed by Dewey and Schon in light of the biofunctional model of cognition reveals that reflection has a firm foundation in cognition and brain functioning. A heightened understanding of the wholetheme nature of learning, with its basis in the dynamic and active forms of self-regulation, offers a clearer understanding of reflective thought, which is the combination of active and dynamic self-realization. Schools today are still mostly organized in a manner that supports the idea of knowledge as a quantifiable object. For this to change, models need to be developed that capitalize more on wholetheme learning in K-12 classrooms. (Contains 25 references.) (ND)

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Reflective Educational Practice from the Perspective of Wholetheme Constructivism

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Abstract

Inspired by the work of Schon and Dewey, educators today consider reflective practice as a viable alternative to the technical-rational paradigm that has historically dominated educational thought in America. This presentation discusses how a deeper understanding of reflective practice may be achieved from the perspective of wholetheme constructivism.

Introduction

Schon (1983) first wrote of a crisis of confidence in professional knowledge, calling into question the ability of professionals to solve the problems of the real world. This is still true of education. The public concern with the state of American education is apparent in press reports citing falling test scores and violence in the schools. The solution often offered is the cry of "back to basics". Yet there are indications that the problem may be broader, resulting from the failure of a technical-rational paradigm in a society where intuitive thinking has been in a rapid state of decline (Howard, 1995).

As an alternative to the technical-rational paradigm, Schon (1983) proposed reflective practice. He argued that reflection is a more accurate way of describing the way professionals naturally think and act in the real world. Inspired by his work (Schon, 1983, 1987, 1991) and the work of Dewey (1929, 1933), educators have begun to consider the use of reflection. Teachers are urged to become reflective practioners and to encourage their students to think reflectively when involved in learning activities. Yet, the organization of schools and the values that support educational practice are still informed by the technical-rational paradigm. We need to develop a greater understanding of what is meant by reflective educational practice if we are ever to bring about a paradigm shift.

That reflective education can be practiced is clear enough. Paulo Friere's (1970) work in adult literacy in Brazil and Chile is an example. He involved adult workers in developing generative metaphors about their experiences in an oppressive society, thus stimulating reflective thought about the context of their lives. Another example is the work of Bamberger (1991) who developed a

"Laboratory for Making Things" in a public school. It was used to supplement classroom learning with hands-on projects using various materials that stimulated reflective discussion about the principles involved in the activity. And, finally, Erickson and McKinnon (1991) described ways of showing and telling that experienced teachers can use with novice teachers in a practicum that allows novice interns to reflectively evaluate their own experiences with students as they learn to become teachers.

Despite these encouraging examples, reflective thought has yet to establish its place in schools. Until the technical-rational paradigm of educational thought is successfully supplanted by a new paradigm, educational reform will continue to be a theoretical construction, or politically rather than professionally driven.

Whatever the new alternative to the technical-rational model of educational parctice might be, reflection is likely to be its leading edge. This chapter examines the ideas of Dewey (1929, 1933) and Schon (1983, 1987) to analyze what these thinkers meant by reflection. It will then explore the relationship of these seminal ideas on reflection to the growing body of theory and research in cognitive science and education. Together they form the basis for what may well become a new educational paradigm.

John Dewey and reflective thought

Dewey (1933) distinguishes between the stream of consciousness that runs through our minds while day dreaming and the disciplined, problem centered thought that he calls reflective thought. Reflective thought is purposeful and directed, intent on understanding and creating meaning from an interaction or realization. As disciplined thought, reflection can be enhanced by training children to think that way.

Dewey (1933) identifies five phases in the reflective cycle of thought. The starting point of reflection is always a doubt or uncertainty that arises unconsciously about an activity. The second phase, is the active organization of the uncertainty into a question to be solved. In the third phase, further thought about the problem organizes it more thoroughly into the preliminary diagnosis of a solution to the problem. Once the solution is tentatively formulated, a rigorous examination of the idea is made in the fourth phase based on previous knowledge. The final phase is action again, testing the hypothesis to see if the planned solution to the problem actually does what is expected.

Dewey (1933) argues that these phases represent an outline of the structure of the reflective cycle of thought, which is neither sequential nor rigid. Each phase has the capacity to lead to new observations and evolve into a different way of defining the problem. Reflection, for Dewey, is a fluid and creative process that evolves over time.

In viewing reflective thought as an internal problem-solving cycle, most evident is the focus of conscious attention on a problem. Yet, it is noteworthy that Dewey also speaks of an aspect of reflection that occurs unconsciously, in the midst of the spontaneous creative process. He values the unconscious mind play that helps bring about familiarity with a new subject or idea. For Dewey (1933), the unconscious mind gives spontaneity and freshness; consciousness, gives command and control.

Dewey's emphasis on experiential learning was designed to place learning within the context of activity, trusting that the student is able to create knowledge while actively engaged in the experience. Knowledge for Dewey (1933) was in the mind of the learner who benefits from the contextual nature of learning activity. Learning is initiated and enacted by students, guided by their own purposes, their own curiosity, and their own desire to learn. The teacher's role is to act as a

facilitator. To do this well the teacher must know the children, their hopes, desires, fears and interests (Dewey, 1933). Teaching is a recursive process and cannot occur without learners, but learning can happen on its own without teachers.

Donald Schon and the reflective practioner

Schon's (1983, 1987) work is strongly grounded in the ideas of Dewey (1929, 1933). Activity, uncertainty, and problem solving in context are central to Schon's conception of reflection as well. More so than Dewey, Schon emphasizes the tacit or intuitve nature of knowledge and the ways of revealing it through self reflection. Schon (1987) speaks of intuitive knowledge with special focus on the knowledge that is tacit in the way we do things. He refers to this as Knowing-in-Action (KIA), which is a result of our activities and which, in turn, informs our activities. KIA is dynamic and, as Dewey (1933) suggested, it cannot be fully described by means of static descriptions of the steps embedded in the action. KIA unconsciously controls how we act in relationship to our environment in any situation (Schon, 1987).

To illustrate KIA Schon (1987) cites an example from Polanyi about how we recognize faces and sensations. According to Polanyi, faces or sensations are not stored in memory and compared with other faces and sensations we may have experienced before. Rather, they emergespontaneously and their appearance triggers awareness. As a result, we see the face of someone we know. If asked how it occured we are likely to be unable to say.

Reflection, for Schon (1987), occurs when there is a surprise, when something interrupts the flow of KIA that guides our everyday activity, just as the reflective cycle for Dewey (1933) began with uncertainty or doubt. We can deal with this surprise, or the resulting doubt or uncertainty (Dewey, 1933), in two ways: Reflection-on-action and reflection-in-action.

One can reflect-on-action, following KIA as we think back on our activities to understand why the surprise has occurred. Reflection-on-action takes place once we have achieved some distance from the occurrence, allowing us to consider the situation evaluatively and critically (Schon, 1983, 1987). We therefore have the ability to tranquilly and thoroughly reconsider what has occured, why it has occured, and what it is about our KIA that has caused a failure to anticipate the occurance.

Schon (1983, 1987) is primarily interested in reflection-in-action which occurs while the person is engaged in an activity and is confronted with a surprise. It is a conscious inquiry which allows the person to frame the problem, comprehend its setting, critically evaluate the underlying assumptions that led to the problem, and construct an alternative method of solving it which can be tested on the spot (Schon, 1987). These steps mirror Dewey's phases of reflective thought, but are clearly presented by Schon as occurring intuitively in the midst of authentic professional practice, while Dewey discusses them in the context of training students how to think reflectively (Dewey, 1933).

Schon (1987) cites examples of reflection-in-action from many professions: the integrated flow of improvisational jazz in which one performer shapes their own presentation from the cues received from the performance of others, the skill of the design professional faced with a challenging building site, or the efforts of the counseling professional facing a client with a compelling problem. He offers an example from his own life of intuitively confronting and solving the problem of how to insure that a gate under construction was square. He found himself intuitively able to frame the problem of triangulation needed to visualize a crosspiece between the corners that would secure the gate, ensuring that it was square. Acting out the solution to the problem had to be a conscious effort, as he focused his attention on nailing the supporting crosspiece together (Schon, 1987).

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Although Schon's (1987) focus is on the education of professionals, his concern is with education in general. His ideas about a crisis of confidence in professional knowledge are based on problems that he sees in the nature of knowledge that permeates education (Schon, 1983). The technical-rational paradigm of knowledge adopted in the early part of this century assumes that scientific understanding is more significant than understanding grounded in real-world experience. The assumptions upon which this paradigm is based are enshrined in our educational institution at all levels, from the universities and professional schools to the majority of K-12 schools. The paradigm is bankrupt because it fails to concern itself with the doubt, uncertainty, uniqueness, and conflict, which are the undeniable aspects of life (Schon, 1987). A more useful way of framing the problem of education is between educational methods that promote reflection, with their emphasis on promoting real-world practice, and those that do not.

The ideal learning environment for Schon is the practicum, wherein one can deal with real problems in a secure, though almost real learning environment. He describes a design studio inwhich the teacher and the student confront real problems and grow together, through dialogue, in understanding as they engage in the process of working through the problem. Schon, emphasizes the practicum as the most important part of all professional learning, and looks for ways that it can fit into professional education (Schon, 1987).

Schon's work has inspired research into the way professionals and children think. Bamberger (1991) examined the flow of reflective conversation amongst adults and children and called it "conceptual chaining" because of the way one articulated thought forms the basis for the next one. She considers this a vehicle for authentic learning. Erickson and MacKinnon (1991) describe the way a teaching practicum can lead a novice teacher to critically reflect on their own practice and

begin to shape the way they need to act in order to encourage reflective inquiry in their students. These ideas are just the beginning of the way educators can use reflection.

Reflections about Reflective Thought

What we have described so far is the cycle of reflection that occurs in problematic situations, involving identifying a problem in an action, planning a subsequent action in response to the problem, acting out the response, and evaluating the result. Reflection occurs when we have experienced a surprise in action that interrupts our unconscious flow of knowledge, called KIA. It is a process that can happen both outside the realm of our conscious attention and within it.

Reflection enables us to solve problems while we are engaged in our normal practice. It allows us to confront and overcome anomolies (doubts, uncertainties, surprises, interruptions) in our experience. It can help us look back and understand what has happened. And, when the problematic situation is sufficiently contradictory, reflective thought allows us to reorganize our KIA, to create a new set of assumptions about reality.

Reflection is concerned with thought, and the training of thought. Schon thinks of reflective education primarily in terms of professional practice (1983, 1987). Dewey (1933) states that the mind can be trained to think reflectively, implying that it has a role in K-12 education. Practicing reflection as an active, conscious process, facilitates its development. However, reflection is not a rigidly automatized skill (Anderson, 1990), but a finely tuned way of thinking and approaching problematic situations that can be facilitated by education.

Reflective thought occurs within the human organism. It has a biological basis that even Dewey (1929) has acknowledged. Cognitive psychology concerns itself with the nature of thought and has produced a number of theories to describe it that have had an important impact on eduational

practice. Much of the way knowledge has become specialized, forming what Schon (1987) terms the "higher knowledge" of academic disciplines, stems from early psychological constructions that treat knowledge in a piecemeal fashion, where the whole emerges from its parts. Another approach, biofunctional cognition, treats knowledge from a wholetheme perspective, where an understanding of the parts emerges in the context of the whole (Iran-Nejad, 1990). Examining the views of learning from this perspective provides a different understanding of reflective thought and its role in education.

Active Control and Single-Source Learning

A salient aspect of reflection is conscious control of ones own thought and action. Therefore, an understanding of the role of conscious control is an essential prerequisite for understanding the process of reflection. One popular conception of conscious control postulates an internal central executive as the one and only regulator of our attention. This single-source view of self-regulation is popular with the computer-inspired information processing theory; but is also implicit in much educational thinking. The idea of structuring instruction so that it occurs in a piecemeal manner, from the simplest to the most difficult, is based to a very large extent on this view.

The single-source view implies that knowledge is stored schematically in the brain and learning occurs in response to external input, which requires conscious attention. Morever, in order to retrieve knowledge the focus of our attention must be on memory processes which also requires conscious attention. This makes it impossible to attend simulatneously to both input and retrieval activities, let alone engaging in extensive problem solving activities. One strategy for resolving this dilemma, within the confines of active, self-regulated attention, is prediction based learning (Iran-Nejad, 1990).

Equipped with a single source of internal self-regulation, the active individual must first focus on an internal theory to consciously make a prediction, derive a hypothesis, and only then, attend to the environment to test this hypothesis -- one step at a time. In this way, learning can occur only one conscious capacity load at a time, in a piecemeal manner. Learning of this sort must be, therefore, necessarily incremental and sequential (Iran-Nejad, 1990).

Clearly our own experience contradicts this model. We have the ability to see and hear and think simultaneously. One need only think of a morning walk when we see what is around us and reflect upon the lessons planned and hope they will translate successfully into classroom activity. The implication is that there must be more than one internal source controlling internal learning processes.

Dynamic Control and Simultaneous Learning

The alternative to looking at self-regulation as an active single-source process is to consider that the organism learns continually whether or not conscious attention is given to what is being learned. Our brain functions through the ongoing activity of its various subsystems without us consciously willing them to do so. Because these subsystems have the capacity to self-regulate, they can contribute to learning dynamically or unconsciously. Iran-Nejad (1990) has termed this unconscious capacity of brain subsystems to regulate their activity dynamic self-regulation, which constitues an independent source of internal self-regulation in its own right.

Under dynamic self-regulation the brain is able to learn from multiple external and internal sources simultaneously. Not only are these the normal, automatic, unconscious functions of the organism, but they include the plethora of external sources available through our senses, as well as

the active self-regulation of attention. Because of these multiple sources of self regulation, learning occurs both dynamically and actively.

Consider the way a child learns language. During early childhood, language is rarely taught explicitly. Children seem to learn language by unconsciously playing with sounds (Dewey, 1933). Children in multicultural households learn two or more languages, without having to be taught, and fully comprehend their different usages. All children have this capacity. Most are fortunate enough to live in a rich environment that enables them to learn what goes on around them. Much of this learning occurs dynamically, outside the conscious control of the learner. It happens simultaneously, as the various subsystems of the brain work together.

Dynamic multisource learning overcomes the limitations of active single source learning. The multiple sources involved in the operation of the brain explain how KIA guides us through life and allows us to reflectively learn after we focus attention on a surprising occurance. The knowledge reflectively created may supplement KIA or, if what is learned is sufficiently dissonant to cause us to question the assumptions upon which the KIA is based, it can lead to reconceptualization through the process of postdiction.

The concept of postdiction has been developed by studies of surprise ending stories (Iran-Nejad, 1986, 1990). In one study (Iran-Nejad, 1987) subjects read a story that led them to conclude that one ending was likely. They were then given a clue which offered new evidence enabling them to reflect upon the surprise that changed their conception of the story. Reflection led them to reconceptualize their ideas about what happened in the story. The findings supported the hypothesis that reconceptualization occurs dynamically, automatically, and outside of the spotlight of conscious attention.

Rather than presenting knowledge in a piecemeal fashion to feed the narrow bottleneck of conscious attention, a learner can be better served by organizing knowledge thematically, offering students the opportunity to reflectively develop intuitive knowldge of the whole before focusing on the parts. Iran-Nejad (1993, 1994) has called this type of instruction wholetheme teaching.

Thematic Knowledge and Wholetheme Learning

The brain consists of many self-regulating subsystems. Each subsystem is specialized and responsible for different aspects of the experience of the organism. When a number of subsystems are working together the knowledge created is thematic. Thematic knowledge is KIA. It changes as we move through life experiences. If we encounter a surprise that hits upon a sufficiently compelling new theme, it allows us to reconceptualize the intuitive assumptions that help define our KIA. This is what is meant by postdiction and thematic reconceptualization.

Wholetheme learning is proposed as a way of taking advantage of the multisource aspects of brain operation (Iran-Nejad, 1994). Learning opportunities are best structured in a manner that recognizes the dynamic and active aspects of learning by making them stimulating and attractive, able to guide attention, interest, and curiosity (Marsh & Iran-Nejad, 1994). This dynamic and active learning environment takes place within the context of an overall theme, to which learning activies can be reflectively related. A thematic organizer can be used to provide a visual context for the learning opportunities presented (Iran-Nejad, 1994). The presence of the organizer allows the student to reflect upon their learning experience in relation to the theme and facilitates the students' internal construction of thematic knowledge.

Wholetheme Learning and Reflection

Reconsidering reflection as expressed by Dewey and Schon in light of the biofunctional model of cognition developed thus far reveals that far from being just a philosophical construct, reflection has a firm foundation in cognition and brain functioning. Reflection, in all its various forms, fits into a wholetheme model of educational practice derived from biofunctional cognition.

Far from being confined within the narrow bounds of the bottleneck of active attention, reflection involves extensive dynamic self-regulation and learning. Active attention can be paid to particular parts of the wholetheme, but it is not necessary for learning to occur. Learning can occur dynamically anywhere or everywhere in the entire realm of the whole theme, in which conscious attention can move from one part to another guided by the process of reflection.

Therefore, reflection-in-action is both an active and dynamic learning experience. Schon (1983, 1987) describes us involved in activity in which we are dynamically guided by our KIA. Some surprise interrupts this flow and causes active attention to be applied, raising a question. One might actively predict a solution which could be tested and evaluated, or dynamically become aware of how the problem could be solved. Once a solution is dynamically revealed, it can be analyzed actively. If the solution is problematic, active self-regulation may intermediate until the problem is resolved or the solution is abandoned in favor of another. The result may be a reconceptionalization of the problematic situation.

Schon (1983, 1987) has written extensively about the interaction between the teacher and student in a practicum that takes place in a design studio. The design problem assigned is a challenging building site, and the student develops solutions based on the shared intuitive understanding of the design process, established jointly in classroom teaching and through shared

experiences. During the process a design review takes place in which the teacher visits the students' work bench and listens as they explain what they did and why. The teacher responds to the explanation and articulation of the problem and may propose a variety of new ways of framing and visualizing the problem. The individual student is free to continue to work as before, build upon the ways the teacher has articulated, or model the teacher's problem solving behavior to come up with their own original perspective on the problem.

The established challenging design problem here serves as a thematic organizer (Iran-Nejad, 1994). All the conversation that occurs between the teacher and the student is in reference to this thematic organizer. The learning that occurs in the design studio is embodied in the communication between the teacher and the student. The student's ideas for the building site and the restrictions of the site present the problem. Within this frame the teacher is able to conceptualize a variety of design alternatives that suggest different ways of approaching the problem (Schon, 1987). These are not solutions, they are modeling demonstrations of reflection-in-action that the student can potentially adopt. The knowledge created in the interaction is the understanding of the student who grasps the process in light of the theme, through reflection-on-action.

As another example, let us imagine the application of wholetheme learning in a K-12 classroom. A broadly based theme is established for the learning that will occur in the classroom during the year. Within the theme, multidisciplinary content laden projects are developed that allow students to investigate phenomena and discover results. Students engage in an action research cycle of questioning, reflectively formulating problems, creating possible solutions, collecting data, constructing a test of their hypothesized solutions, and reflecting upon the results. The learning that occurs within the activity is not confined to the limited spotlight of active attention. Rather, it occurs

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during the dynamic reflective process that follows the activity. This is Schon's concept of reflection-on-action, looking back on what has been learned about the theme, as a result of the activity in which they were engaged.

Discussion

A heightened understanding of the wholetheme nature of learning, with it's basis in the dynamic and active forms of self-regulation, offers a clearer understanding of what is happening when we speak of reflective thought. Reflection is the combination of active and dynamic self-regulation. At times it is a definite, prolonged, and active look at what has happened. Other times it is an active acknowledgement and adjustment resulting from a dynamically perceived anomaly. Still other times it is reflection on a situation that is sufficiently dissonant to lead to postdiction and thematic reconceptualization.

The application of reflective thought to educational settings is likely to remain problematic until there is a realization of the bankruptcy of the technical-rational paradigm of educational thought. Our schools today are still mostly organized in a manner that supports the idea of knowledge as a quantifiable object. Our methods of standardized assessment bear witness to this fact. Frightening as well is the political hue and cry that test scores be used to judge the effectiveness of public investment in the schools.

In order for this to change we need to develop models of schooling that capitalize more on wholetheme learning in K-12 classrooms. Examples such as those reviewed here can seed the process of change that we so definitely need. The crisis of professional knowledge that affects education will not be solved by the public suddenly coming to realize that the technical-rational

paradigm of education is no longer a suitable model for today. The change needs to come from educators acting together to reshape the actual process of education.

The authentic restructuring of schools will not be successful until it first addresses the core of learning, the teacher student relationship (Fullan, 1994). Recognition of the wholetheme nature of learning and the role of reflective practice on the part of teachers and students will vastly improve the likelihood of this change arriving sooner.

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